

DISCLAIMER: These Standard Operating Procedures (SOP's) are for the exclusive use of Navy Public Works Center (PWC) Norfolk. They are promulgated as guidance for their NAVFAC Commands. If intended to be used by other activities, they must be tailored to each activity's particular requirements and must be reviewed/approved by the activity's safety professionals prior to use.

**NAVY PUBLIC WORKS CENTER
NORFOLK, VIRGINIA
UTILITIES DEPARTMENT**

STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS

TITLE

**REPLACE AN OPERATING TRANSFORMER
INSTALLED IN A METAL CLAD SWITCHGEAR**

**PROCEDURE NUMBER
WC 624 HVE 096**

SIGNED: _____
(DATE)

APPROVED: _____
(DATE)

SAFETY PROFESSIONAL: _____
(DATE)

MANAGEMENT OFFICIAL: _____
(DATE)

REVISION

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REPLACE AN OPERATING TRANSFORMER
INSTALLED IN A METAL CLAD SWITCHGEAR

DISTRIBUTION

CODE	REV/DATE	REV/DATE	REV/DATE	REV/DATE	REV/DATE	REV/DATE	REV/DATE
601.C3							
620							
622							
610.E1							
622.3							

REPLACE AN OPERATING TRANSFORMER
INSTALLED IN A METAL CLAD SWITCHGEAR

REVISIONS

REV	DESCRIPTION	SIGNATURE	DATE
A	Initial Issue.		

REPLACE AN OPERATING TRANSFORMER INSTALLED IN A METAL CLAD SWITCHGEAR

Purpose:

Replace a potential transformer which is installed in a metal clad switchgear.

Potential Energy Sources:

1. Metal clad switchgear bus.
2. A second operating transformer connected to switchgear via a transfer switch.

Tools and PPE:

Tools: Auger truck, High voltage tester, hand tools, rope, certified sling, and a Multimeter. PPE: Nomex coveralls, Nomex hood, insulating rubber gloves, insulating rubber sleeves, hard hat, safety shoes, work gloves, safety glasses, and back brace if required by back injury prevention and control program. The class of rubber gloves and sleeves will depend on the exposure voltage as per the following: Class 0 - up to 1,000 volts, Class 1 - up to 7,500 volts, Class 2 - up to 17,000 volts, Class 3 - up to 26,500 volts, Class 4 - up to 36,000 volts.

References:

1. PWC Occupational Safety and Health Program Manual,
PWCNORVAINST 5100.33E
2. Occupational Safety and Health Standards for General Industry
(29 CFR PART 1910): Subpart I, Personnel Protective Equipment;
Subpart R, Electrical Power Generation / Transmission / Distribution;
Subpart S, Electrical
3. NFPA 70 E approach distances to exposed, energized, electrical conductors and circuit parts.
4. SOP WC 622 HVE 013, Hazardous Energy Control(Lockout, Tagout)
5. SOP WC 622 HVE 007, Switchout And Switchback Energized Circuit
6. SOP WC 624 001, Set Up And Secure Bucket/Auger Truck

Procedures:

1. Operations personnel will deenergize the metal clad switchgear bus and will ensure there will be no secondary back feeds. Operations personnel will follow SOPs
WC 622 HVE 007, Switchout and Switchback Energized Circuit
WC 622 HVE 013, Hazardous Energy Control(Lockout, Tagout)
2. Open the cubicle door and, if necessary, remove any access covers. Using a high voltage tester test the transformer's primary bushings to verify the transformer is deenergized. Before the bushings are checked, test the high voltage tester on a known energized circuit to verify the tester is working. Test each bus phase, taking care not to cross phase during test. If voltage is detected, stop the test and (a) notify operations personnel that the circuit is still energized, (b) wait for operations personnel to correct the problem, (c) perform the deenergization verification test once again after operations personnel finish switching operations and declare the transformer deenergized. If no voltage is indicated, retest the high voltage tester to re-verify it is working properly. Wear Nomex coveralls, Nomex hood, safety glasses, safety shoes, insulating rubber gloves and sleeves, and hard hat while testing.

REPLACE AN OPERATING TRANSFORMER INSTALLED IN A METAL CLAD SWITCHGEAR

The required PPE for the potential transformer change out will be work gloves, safety glasses, safety shoes, hard hat and a back brace if required to wear one. Refer to JHA for details. If there are exposed, energized 11.5/4.16 kv conductors within 16 feet of worksite, or exposed, energized 34.5 kv conductors within 19 feet of work site, then Nomex coveralls will be worn.

3. Disconnect the primary conductors. If the transformer is a three phase unit, identify and mark with phasing tape, the secondary conductors and ground conductors. Disconnect all connections to the transformer. Disconnect the ground wires last.
4. Remove all hold down bolts. Use a rope or a nylon sling to slide the transformer out of the cubicle onto a hand truck. Move the transformer to a location where it can be removed by a boom truck. Use proper bending and lifting techniques when handling the transformer.
5. Load the new operating transformer onto a hand truck and place it in the cubicle. Maneuver the transformer into the correct position. Use proper bending and lifting techniques when handling the transformer.
6. Secure the new transformer with the hold down bolts.
7. Connect the primary conductor, the secondary conductors, and all ground connections. Connect the ground wires first.
8. Replace all access covers and close the cubicle door.
9. Operations personnel will energize the metal clad switchgear bus and place the secondary system back in normal configuration. Operations personnel will follow SOPs
WC 622 HVE 007, Switchout and Switchback Energized Circuit
WC 622 HVE 013, Hazardous Energy Control(Lockout, Tagout)
10. Check the operating transformer's output voltage.
11. Set up Auger Truck per SOP WC 624 HVE 001, Set Up And Secure Bucket/Auger truck.
12. Using a certified sling and the boom winch, load the old operating transformer onto the boom truck for removal to a storage site for future disposal.
13. Secure Auger Truck per SOP WC 624 HVE 001, Set Up And Secure Bucket/Auger truck.

END